Technical Paper - Regulatory Framework

Executive Summary

Colombia has made meaningful progress in building a national policy and regulatory framework for electric mobility. Through green-growth policy, climate legislation, energy-transition policy, and charging-specific regulation, the country has already demonstrated a clear willingness to support the electrification of mobility. Bogotá and Cali have also incorporated sustainable mobility and decarbonization into their local planning instruments, reinforcing the strategic direction at city level.

Yet the central finding of this paper is that Colombia's next challenge is no longer whether to advance electric mobility. The challenge is how to translate that regulatory willingness into practical, scalable, and implementable charging systems in the urban environments where demand will actually emerge.

This paper argues that the key bridge between policy ambition and implementation is the enabling environment for shared urban charging. This includes charging solutions that operate across residential communities, co-owned properties, commercial and mixed-use developments, shared parking systems, and public-facing or quasi-public urban settings. In these contexts, the main barriers are no longer only about vehicle adoption. They concern compliance, technical readiness, governance, interoperability, financing, and long-term operation.

The analysis shows that Colombia already has many of the formal building blocks needed to support electric mobility. These include:

- national policy direction through green-growth and energy-transition instruments,
- legal recognition of electric mobility and charging infrastructure,
- obligations linked to buildings and parking,
- charging-specific regulations on market conditions and interoperability,
- and city-level planning frameworks in Bogotá and Cali that can support deployment.

However, the paper also finds that the enabling environment remains necessary but not yet sufficient. The current framework is stronger on strategic direction than on execution. Implementation remains fragmented, especially in shared-use environments where ownership, energy use, parking, and governance are distributed across multiple actors.

The main barriers identified in the paper fall into three broad groups.

First, there are critical barriers that block deployment directly. These include weak implementation of existing legal obligations, uncertainty in horizontal-property and shared-use

settings, lack of clear compliance pathways for different site types, and financing constraints at the point of deployment.

Second, there are structural barriers that limit scale and system performance over time. These include incomplete technical standardization, weak alignment between charging policy and wider urban systems, grid-readiness and network-visibility constraints, and a fragmented ecosystem for service-based charging models.

Third, there are enabling barriers that reduce confidence, readiness, and adoption. These include low awareness, limited technical and institutional capacity, and uncertainty about long-term governance, billing, maintenance, and user access in shared environments.

The paper also concludes that the technical challenge of shared urban charging is frequently misunderstood. Charging is often treated as the installation of equipment, when in reality it should be understood as the design and operation of a shared urban service system. A functioning charging system in Colombian cities requires:

- electrical readiness,
- site and parking readiness,
- clear metering and billing logic,
- operational management,
- interoperability where relevant,
- governance structures for shared settings,
- and technical pathways for future expansion.

In this context, buildings remain important, but they are not the whole story. Shared urban charging must also be integrated into mixed-use developments, commercial environments, shared parking assets, and public-facing sites.

This is why the paper places strong emphasis on design standards, operational clarity, and integration with mobility and urban-planning systems.

Within that broader diagnosis, the MubOn partnership is relevant because it helps test how shared charging can operate under real Colombian conditions. Its contribution is not only the deployment of charging infrastructure, but also the generation of practical evidence about the barriers that still prevent scale.

In line with P4G's model, the partnership contributes by combining market validation, stakeholder engagement, policy-interface work, and ecosystem learning. In this sense, MubOn functions as both a deployment platform and a mechanism for identifying where Colombia's enabling environment still needs to improve.

The paper therefore concludes that Colombia does not need to replace its current direction on electric mobility. It needs to make that direction more usable, enforceable, and scalable. The recommendations focus on closing the gap between regulatory willingness and implementation reality through five main pathways:

1. Clearer compliance and technical guidance for buildings, parking systems, shared-use environments, and horizontal property.
2. Stronger enforcement and verification of existing obligations, especially where law already requires charging readiness or EV-related parking provisions.
3. Better integration into city-level planning, including mobility, parking, land use, and public-space systems.
4. More mature technical, operational, and service-model frameworks, including interoperability, metering, billing, and long-term operating logic.
5. Strategic use of design standards and certification pathways to reduce ambiguity and support implementation, especially through LEED, CASA Colombia, EB2 Movilidad, and infrastructure-oriented frameworks such as Envision.

Taken together, these findings support one overarching conclusion:

Colombia's next policy frontier in electric mobility is to close the gap between high-level regulatory willingness and the practical implementation of shared urban charging. If that gap can be narrowed through targeted reforms, implementation actions, technical requirements, design standards, certification pathways, and stronger institutional coordination, Colombia will be significantly better positioned to convert its electric-mobility ambition into durable urban infrastructure, wider adoption, and a more functional charging ecosystem.

1. Introduction & Background

Colombia's transition to electric mobility will depend not only on the adoption of electric vehicles, but on whether the country can create an enabling environment for **shared charging infrastructure in urban areas**. [1] [2] In practical terms, this means enabling charging solutions that can operate across residential, commercial, mixed-use, and public-facing settings where space, access, electricity supply, and cost recovery are shared rather than individual. This is the infrastructure challenge that stands between policy ambition and large-scale adoption.

This framing is especially relevant because Colombia's policy objective is not marginal electrification, but system-level change. The country's Green Growth policy established a 2030 target of **600,000 electric vehicles**, while the Energy Transition Policy placed sustainable

[1] Departamento Nacional de Planeación (DNP), **CONPES 3934 de 2018, Política de Crecimiento Verde**
[2] Departamento Nacional de Planeación (DNP), **CONPES 4075 de 2022, Política de Transición Energética**;

transport within a broader pathway for low-emissions development, competitiveness, and modernization. Yet vehicle targets alone do not guarantee charging access. International evidence shows that large-scale EV adoption depends on the rollout of accessible and affordable charging infrastructure, and that most charging still occurs at home, even though the role of other private and public charging is expected to grow as adoption expands.[3]

The urban dimension is therefore decisive. In Colombian cities, future charging demand is likely to concentrate in multifamily housing, co-owned properties, office complexes, commercial centers, shared parking facilities, and selected public or quasi-public spaces. In these settings, charging deployment is shaped not only by transport demand, but also by land use, electrical adaptation, technical standards, governance arrangements, and service models. The enabling environment for electric mobility must therefore be understood through the intersection of transport policy, urban planning, electricity regulation, and deployable business models, rather than through vehicle incentives alone.[4] [5]

Within that context, the relevance of MubOn lies in the type of solution it brings to market. P4G describes the MubOn partnership as developing a **cost-effective model for installing intelligent EV charging infrastructure** in Colombia, aimed at addressing the scarcity of charging points, the limited space available in residential and commercial areas, and the low adaptability of conventional charging systems. P4G also states that the partnership seeks to improve regulatory conditions while promoting the adoption of electric mobility in the country.[6] Framed this way, the challenge is not simply one of installing equipment at isolated sites; it is one of enabling a shared urban charging service that can function across dense and diverse urban environments.

This approach aligns directly with P4G's institutional model. P4G states that it contributes to **green and inclusive growth** in low- and middle-income countries by helping early-stage businesses become investment ready, supporting country climate transitions, and contributing to enabling-systems improvements in partner countries. Its approach combines grant funding, technical assistance, and public-private engagement so that promising climate businesses can scale while remaining aligned with national development and climate priorities. A technical paper focused on shared urban charging therefore fits squarely within that logic: it addresses both the scalability of the solution and the regulatory and market conditions required for that solution to deliver impact. [6]

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[3] International Energy Agency (IEA), **Global EV Outlook 2024**, "Outlook for electric vehicle charging infrastructure"(IEA)
[4]Secretaría Distrital de Movilidad de Bogotá, **Plan de Movilidad Sostenible y Segura (PMSS)** (observatorio.movilidadbogota.gov.co)
[5] Comisión de Regulación de Energía y Gas (CREG), **Alejandría – Vehículos eléctricos, estaciones de carga** (Movilidad Bogotá)

[6] P4G, **MubOn – Fundación Cleantech Hub** (P4G)

Colombia's regulatory framework provides a solid basis for this analysis. **Law 1964 of 2019** promotes the use of electric and zero-emission vehicles and defines charging stations as part of the electric mobility ecosystem. It also requires special-category municipalities to guarantee a minimum number of rapid charging stations and sets a higher threshold for Bogotá.[9] **Law 2169 of 2021**, the Climate Action Law, further anchors transport decarbonization within Colombia's broader climate-policy framework. [7] At the policy level, **CONPES 4075 of 2022** links sustainable transport, energy transition, and low-carbon growth, providing an institutional bridge between climate ambition and sector implementation.

The regulatory architecture has also become more technically specific. **Resolution 40123 of 2024** establishes interoperability conditions for public-access charging stations for electric and plug-in hybrid vehicles. It defines public and private charging stations, sets the scope of application for the actors participating in public-access charging, requires the use of open communication protocols such as OCPP or equivalent standards, and requires price information to be displayed transparently to users. In parallel, the CREG regulatory environment has treated EV charging and **electrolineras** as a distinct regulatory topic and has compiled international regulatory experience on charging infrastructure and market design. These developments are important because shared urban charging depends not only on whether chargers can be installed, but on whether they can operate in a system that supports interoperability, transparent access, and viable service provision.[8]

The city level is equally important. Bogotá's **Plan de Movilidad Sostenible y Segura (PMSS)**, adopted through **Decreto 497 de 2023**, is presented by the city as its long-term roadmap for transforming mobility into a system that is more efficient, safe, sustainable, and environmentally friendly. The PMSS is supported by a full planning package that includes the decree, a **Documento Técnico de Soporte**, a **Plan de Acción**, a **Programas y Proyectos** annex, cartography, and a **Plan Maestro de Estacionamientos**.[4] This is directly relevant to shared urban charging because it situates infrastructure within a broader urban mobility ecosystem rather than treating it as a purely private asset. In that sense, charging infrastructure should be understood as part of how cities organize access, circulation, parking, and service provision across dense urban areas.

Seen together, these elements define the central thesis of this paper: **Colombia's next challenge in electric mobility is to strengthen the enabling environment for shared charging in urban areas**. That challenge sits at the intersection of infrastructure deployment, urban space, regulation, interoperability, and investment. It is shaped by the market logic

[7] República de Colombia, **Ley 2169 de 2021, Ley de Acción Climática**; official legal basis for Colombia's climate-policy architecture.
[8] Ministerio de Minas y Energía, **Resolución 40123 de 2024**; Article 1 establishes interoperability conditions for public-access charging stations, while later articles define actors, open communication requirements, and price transparency obligations. (Suin Juriscol)

represented by MubOn, by P4G's focus on scalable public-private solutions for green and inclusive growth, and by a Colombian regulatory framework that is already advanced but still evolving in operational terms. The purpose of this paper is therefore to identify how these dimensions can be aligned to accelerate implementation, reduce deployment friction, and support a more scalable and inclusive charging ecosystem in Colombian cities.

2. Partnership Objectives and Strategic Relevance

2.1 Long-Term Transformation Goal

The long-term objective of the MubOn partnership is to contribute to the transition away from fossil-fuel-based transport systems by enabling the wider adoption of electric mobility in Colombia through scalable charging infrastructure and stronger market conditions for deployment. This objective is not limited to the installation of charging hardware. It is linked to the broader transformation required for electric mobility to scale in practice: accessible charging, viable service models, public-private coordination, and a regulatory environment that allows charging infrastructure to operate efficiently in dense urban settings.

In that sense, the partnership sits within a broader systems transition. Colombia has already established national policy commitments for sustainable transport and electric mobility, but the pace of future adoption will depend on whether charging infrastructure can be deployed in forms that are financially viable, operationally scalable, and compatible with the realities of urban land use, shared parking, multifamily properties, and mixed-use developments. The long-term ambition of the partnership is therefore not simply to add charging points, but to help shape the enabling environment in which shared urban charging can become a normal part of Colombian mobility and urban development.[9] [10]

2.2 Objective During the P4G Funding Period

During the P4G funding period, the immediate objective of the partnership is to validate and scale MubOn's intelligent charging infrastructure model as a commercially viable response to the barriers that continue to constrain EV charging deployment in Colombia. P4G describes the partnership as developing a **cost-effective model for installing intelligent electric vehicle charging infrastructure**, while also seeking to improve regulatory conditions and promote the use of electric mobility in the country.

[9] Departamento Nacional de Planeación (DNP), "CONPES de Crecimiento Verde consolida logros del gobierno en materia ambiental con visión a 2030." (2022.dnp.gov.co)

[10] Departamento Nacional de Planeación (DNP), "Aprobado CONPES de Transición Energética que consolidará el proceso hacia un desarrollo y crecimiento económico sostenible." (Departamento Nacional de Planeación)

This objective has a dual strategic function. First, it aims to demonstrate that shared charging infrastructure can be deployed through a model that lowers entry barriers for residential, commercial, and institutional host sites. Second, it aims to generate practical evidence about the regulatory, technical, and market conditions required for that model to scale. In that sense, the partnership period is not only a deployment phase for a market solution; it is also a structured learning phase for enabling-system improvement.

2.3 Strategic Relevance to Colombia

The partnership is strategically relevant to Colombia because it responds to a gap that sits at the center of the country's electric mobility transition. National policy has created momentum for electric vehicles, and the regulatory framework has evolved significantly in recent years. However, policy ambition alone does not resolve the operational challenge of building charging networks in urban environments where land, parking, energy supply, and cost recovery are shared across multiple users and property arrangements.

This gap is particularly important because Colombia's policy objective is not marginal electrification, but system-level change. The Green Growth policy adopted through CONPES 3934 established the target that **600,000 electric vehicles** should form part of the national fleet by 2030, while CONPES 4075 later linked sustainable transport directly to the country's broader energy-transition agenda. The strategic relevance of the partnership lies in addressing the practical conditions needed to move from these policy ambitions toward workable deployment models in real urban settings.[11]

2.4 Public-Private Partnership Logic

The partnership is also strategically relevant because it aligns directly with P4G's institutional model. P4G states that it contributes to **green and inclusive growth** in low- and middle-income countries by helping early-stage businesses become investment ready, supporting country climate transitions, and contributing to improvements in enabling systems. Its stated approach combines grant funding, technical assistance, and multi-stakeholder engagement so that early-stage climate businesses can scale while remaining aligned with national climate and development priorities.

The MubOn partnership fits squarely within that model. It is not structured only as an infrastructure rollout effort, but as a public-private initiative that combines deployment, market validation, policy engagement, and enabling-environment learning. This is important because shared charging infrastructure depends not only on technical installation, but also on the

[11] Departamento Nacional de Planeación (DNP), "CONPES de Crecimiento Verde consolida logros del gobierno en materia ambiental con visión a 2030." (2022.dnp.gov.co)

interaction between private investment, regulatory clarity, municipal planning, interoperability rules, and service delivery conditions.

2.5 Expected Systemic Contribution

The expected contribution of the partnership can be understood across three levels.

First, it seeks to support **market validation**. By demonstrating a cost-effective and intelligent charging model, the partnership can help reduce perceived risk for host sites, investors, and public stakeholders, while illustrating the role that service-based deployment models can play in expanding charging access.

Second, it seeks to support **enabling-environment improvement**. P4G's own approach requires partnerships to identify barriers to scaling and develop policy and regulatory recommendations to overcome them. In the case of MubOn, this is particularly relevant because Colombia's regulatory framework for electric mobility is already advancing toward more detailed market rules, including interoperability conditions for public-access charging stations and regulatory attention to EV charging as a distinct subject within the energy sector.

Third, it seeks to support **replicability and scale**. If the model proves commercially and operationally viable, it can provide a basis for expansion across additional sites and cities, while also generating lessons that are relevant to other developing-country contexts facing similar constraints around dense urban charging, shared-use environments, and limited bankability for early-stage charging infrastructure.

2.6 Role of This Technical Paper

Within that context, this technical paper serves a specific strategic purpose. Its role is not to promote the partnership in general terms, but to analyze the enabling conditions required for shared urban charging to scale in Colombia and to identify how those conditions can be strengthened through regulation, planning, technical standardization, and market-oriented reform.

The relevance of the partnership to this paper is therefore analytical as well as practical. MubOn represents a concrete market response to a public-policy and infrastructure challenge, while P4G provides the partnership model through which that response can generate broader system learning. This chapter thus establishes why the partnership matters within the argument of the paper: not only because it may deploy infrastructure, but because it provides a useful lens through which to assess the barriers, opportunities, and institutional conditions that shape the future of shared urban charging in Colombia.

3. Methodology and Analytical Framework

3.1 Methodological Approach

This technical paper applies a qualitative, policy-oriented methodology to assess the enabling environment for **shared urban charging** in Colombia. Its purpose is not to produce a market forecast or an engineering design manual, but to identify the legal, regulatory, urban, technical, institutional, and implementation conditions that shape whether charging infrastructure can be deployed and operated at scale in dense urban settings. The current working draft already defines the methodology around four evidence streams: national policy analysis, city-level policy analysis, multi-stakeholder workshops, and construction-sector diagnostics.

The methodology was refined through the annex structure developed for this paper. In its final form, the evidence base is organized into:

- **Annex A**: National Policy and Regulatory Matrix
- **Annex B**: Workshop and Stakeholder Engagement Findings
- **Annex D**: Public Policy Implementation and Action Matrix

Together, these annexes allow the methodology chapter to move beyond a simple list of sources and instead define how each body of evidence informs the analytical chapters that follow.

3.2 National Policy and Regulatory Review

The first evidence stream is a review of Colombia's national legal and policy framework for electric mobility and charging infrastructure. This review establishes the formal policy direction, legal obligations, and market rules that shape the enabling environment for shared urban charging. It is structured through **Annex A**, which distinguishes between strategic policy instruments, binding legal provisions, operational charging rules, and interpretive guidance.

The review centers on the sources that most directly affect deployment:

- **CONPES 3934 de 2018**, which set the long-term green growth ambition including the 600,000 EV target by 2030;
- **CONPES 4075 de 2022**, which links sustainable transport to the energy-transition agenda;
- **Law 1964 of 2019**, which connects electric mobility to charging infrastructure and building requirements;
- **Law 2169 of 2021**, which embeds transport decarbonization in Colombia's climate framework;

- **Resolution 40223 of 2021** and **Resolution 40123 of 2024**, which shape the technical and market treatment of charging infrastructure; and
- regulatory interpretation by **CREG** and the **SSPD**, especially for charging as a service and charging in co-owned properties.

This national review is essential because the central thesis of the paper depends on more than EV promotion in general. It depends on whether Colombia's regulatory architecture is sufficient to support shared charging across buildings, co-owned properties, commercial sites, and public-facing urban environments.

3.3 City-Level and Urban-Implementation Analysis

The second evidence stream is a city-level analysis of how national policy translates into urban planning and local implementation conditions. This review focuses on **Bogotá** and **Cali**, the two cities selected in the underlying diagnosis and workshop process. The CCCS diagnosis explicitly states that the study focused on Colombia and on the two cities of Bogotá and Cali in order to explore opportunities for promoting electric mobility from the construction and buildings sector.

At the city level, the analysis examines how mobility plans, land-use instruments, parking systems, and local zero-emission policies shape the conditions for shared urban charging. The diagnosis already shows that Bogotá has a more advanced urban policy environment, including the **PMSS**, the **POT Bogotá Reverdece**, and the **Zero- and Low-Emission Mobility Policy**, while Cali has integrated electric mobility through the **PIMU**, the **POT**, and local climate-management instruments.

This city lens is methodologically necessary because charging infrastructure in shared urban areas is not determined by national law alone. It is also shaped by:

- local parking systems,
- mobility planning,
- treatment of public or quasi-public space,
- local project pipelines,
- and city-level implementation capacity.

3.4 Stakeholder Engagement and Participatory Evidence

The third evidence stream is stakeholder engagement. This paper uses the findings consolidated in **Annex B**, which compiles the evidence from the Bogotá workshop, the Cali workshop, the private-sector engagement track, and the residential-segment webinar. The CCCS diagnosis explains that the workshop phase was designed to generate practical inputs

from key stakeholders, with workshops in Bogotá, Cali, and the construction-sector value chain, followed by integration of the findings into recommendations and an action plan.

The workshop evidence is particularly valuable because it captures implementation friction that is not always visible in the legal texts. The Bogotá workshop identified barriers including misinformation about regulations, difficulties with communal electrical networks, non-compliance with the 2% parking requirement, lack of guidance for older buildings, and security and access problems for shared charging in public buildings. The Cali workshop added further barriers including outdated norms, unclear treatment by network operators, lack of urban charging nodes, fire-safety concerns, and the need to align electromobility with wider transport-management goals.

The methodological role of this evidence is not statistical generalization. Rather, it is to ground the paper's analysis in stakeholder experience and to validate where formal policy and real-world deployment conditions diverge.

3.5 Implementation and Action-Plan Evidence

The fourth evidence stream is implementation planning. Rather than treating policy recommendations as abstract proposals, this paper uses **Annex D** to translate policy priorities into an operational framework of actions, timelines, responsible institutions, governance mechanisms, and indicators.

The implementation plan defines a general objective of accelerating electric mobility through effective implementation of Law 1964/2019, regulatory strengthening, infrastructure expansion, and articulation with the construction and public transport sectors, all aimed at reaching 600,000 EVs by 2030. It then organizes the implementation pathway around short-, medium-, and long-term goals and five strategic axes:

1. normative and regulatory strengthening,
2. incentives and financing,
3. infrastructure and technology,
4. training and civic culture, and
5. integration with the construction and transport sector.

It also defines governance mechanisms through an **Interinstitutional Electric Mobility Council**, regional boards in key cities, and public-private partnerships, and it identifies monitoring indicators such as EVs in circulation, percentage of parking spaces with chargers, percentage of new buildings with electrical service connection, number of fast-charging stations installed, green credits granted, and numbers of citizens and technicians trained.

Methodologically, this matters because it gives the paper an implementation spine. It allows the analysis in Chapters 4–8 to be judged not only against broad policy ambition, but against concrete action pathways and measurable outcomes.

3.6 Analytical Framework: The Enabling Environment for Shared Urban Charging

The evidence above is analyzed through one common lens: the **enabling environment for shared urban charging**.

For the purposes of this paper, the enabling environment is defined as the set of conditions that determine whether charging infrastructure can be deployed and operated across shared urban settings. This includes:

- **policy and legal conditions**, such as laws, resolutions, and institutional mandates;
- **urban and local implementation conditions**, such as mobility plans, parking systems, public-space treatment, and city-level coordination;
- **technical and operational conditions**, such as interoperability, metering, safety, electrical readiness, and maintenance responsibility;
- **financial and market conditions**, such as credit lines, incentives, service models, and the viability of third-party charging provision; and
- **capacity and governance conditions**, such as institutional coordination, dissemination of norms, technical training, and public-private collaboration.

This analytical framework is broader than a narrow review of building compliance. It reflects the paper's thesis that the next challenge for electric mobility in Colombia lies in enabling shared charging across buildings, co-owned properties, commercial sites, parking assets, and selected public-facing urban spaces.

3.7 Scope and Limitations

This methodology is intentionally practical and policy-facing. It is designed to support a technical-policy analysis, not to replace engineering design, detailed grid simulations, or econometric modeling of charging demand. The study does not attempt to forecast national infrastructure demand quantitatively, model power loads site by site, or evaluate every city in Colombia.

It also has clear evidentiary limits. The workshop findings are qualitative and context-specific, but they are still highly useful because they illuminate real implementation barriers. The city analysis focuses on Bogotá and Cali, which are highly relevant but not fully representative of all Colombian urban contexts. The implementation plan is a project-generated instrument rather than a binding public policy document, so its value lies in operational synthesis rather than legal authority.

These limitations do not weaken the paper. They define its intended role: a technically informed policy paper that integrates public regulatory sources, local policy context, stakeholder evidence, and implementation planning to identify how Colombia can strengthen the enabling environment for shared urban charging.

4. Diagnosis of the Enabling Environment

4.1 Overview

Colombia has already built a substantial policy and regulatory foundation for electric mobility. At the national level, this foundation combines green-growth policy, energy-transition policy, climate legislation, and specific rules for charging infrastructure. At the city level, Bogotá and Cali have incorporated sustainable mobility into their planning instruments, although with different levels of maturity and operational detail.[12][13][14][15]

The diagnosis developed in this paper is therefore not that Colombia lacks a framework. The diagnosis is that the framework is **present but incomplete as an enabling environment for shared urban charging**. In other words, Colombia has made meaningful progress in defining policy direction and regulatory intent, but the conditions required to deploy charging infrastructure across buildings, shared parking, co-owned properties, commercial sites, and public-facing urban settings remain uneven. This conclusion draws on the national and city-level source mapping compiled in **Annex A** and the implementation logic summarized in **Annex D**.

For the purposes of this chapter, the enabling environment is assessed across three levels:

- the **national policy and regulatory framework**,
- the **city-level implementation environment**, and
- the **operational conditions** required to move from legal recognition to scalable deployment.

4.2 National Policy and Regulatory Framework

At the national level, Colombia's framework is stronger than that of many peer markets because it links electric mobility not only to climate and transport policy, but also to infrastructure and the built environment. **CONPES 3934 de 2018** established the Green Growth framework and is the clearest public source for the 2030 target of **600,000 electric vehicles** in the national fleet.[1]

[12] Departamento Nacional de Planeación (DNP), CONPES 3934 de 2018 – Política de Crecimiento Verde.. (DNP 2022)
[13] Departamento Nacional de Planeación (DNP), CONPES 4075 de 2022 – Política de Transición Energética. (DNP)
[14] Secretaría Distrital de Movilidad de Bogotá, Plan de Movilidad Sostenible y Segura (PMSS). (Movilidad Bogotá)
[15] Secretaría Distrital de Planeación, CONPES D.C. 30 de 2023 – Política Pública de Movilidad Motorizada de Cero y Bajas Emisiones 2023–2040. (SDP)

CONPES 4075 de 2022 then placed sustainable transport within the broader energy-transition agenda and explicitly promoted the use of zero- and low-emission energy sources in transport.

That strategic framework is reinforced by binding law. **Law 1964 of 2019** promotes the use of electric and zero-emission vehicles and includes provisions that connect charging infrastructure to buildings and parking. Most importantly for this paper, the law requires new residential and commercial buildings—subject to its scope—to provide electrical access and supporting infrastructure for EV charging, and it also establishes obligations related to parking for electric vehicles. **Law 2169 of 2021** places transport decarbonization within Colombia's broader climate-policy architecture, strengthening the legal basis for low-carbon mobility and related infrastructure.[16][17]

The national framework has also become more operational in recent years. **Resolution 40223 of 2021** established minimum standardization and market conditions for charging infrastructure for electric and plug-in hybrid vehicles, while **Resolution 40123 of 2024** established interoperability conditions for public-access charging stations and defined key operational requirements for market actors.[18][19] In parallel, the CREG regulatory environment recognizes EV charging and **electrolineras** as a distinct regulatory topic, which confirms that charging infrastructure is not being treated as a marginal issue within the energy sector.[20]

This is a real strength. The national framework already contains the essential pillars of an enabling environment: policy ambition, legal recognition, charging-specific regulation, and emerging operational rules. As shown in **Annex A**, Colombia is not starting from zero.

Yet the framework is still incomplete from an implementation perspective. Much of the current architecture establishes direction and general obligations, but it does not fully resolve the practical issues that determine whether shared charging can scale: technical compliance pathways, old-building adaptation, horizontal-property governance, coordination with utilities, enforcement of existing obligations, and consistent treatment of public-facing deployment. These are not abstract gaps; they are exactly the kinds of issues that reappear in **Annex B** and **Annex D**.

4.3 Bogotá: Stronger Policy Integration, Persistent Deployment Friction

Bogotá has the most advanced city-level enabling environment among the cases reviewed in this paper. The city has adopted the **Plan de Movilidad Sostenible y Segura (PMSS)** through

[16] República de Colombia, Ley 1964 de 2019. Public legal text establishing measures to promote electric vehicles and related charging infrastructure obligations. (Suin Juriscol)
[17] República de Colombia, Ley 2169 de 2021 – Ley de Acción Climática. Official legal text. (Suin Juriscol)
[18] Ministerio de Minas y Energía, Resolución 40223 de 2021. (Suin Juriscol)
[19] Ministerio de Minas y Energía, Resolución 40123 de 2024. (Suin Juriscol)
[20] CREG, Alejandría – Vehículos eléctricos, estaciones de carga. Official thematic regulatory gateway for EV charging and electrolineras. (Suin Juriscol)

Decreto 497 de 2023, and the official PMSS portal presents the plan together with its technical support document, action plan, programs and projects, cartography, and **Plan Maestro de Estacionamientos**. This gives Bogotá a relatively strong urban-planning platform for integrating charging into mobility, parking, and broader urban-system decisions.

Bogotá has also adopted a more specific policy for motorized zero- and low-emission mobility. **CONPES D.C. 30 de 2023**, published by the Secretaría Distrital de Planeación, establishes the **Política Pública de Movilidad Motorizada de Cero y Bajas Emisiones 2023–2040**. This is especially important because it places charging infrastructure within a city-level transition strategy rather than leaving it as an implied consequence of national law.

In addition, Bogotá's **POT Bogotá Reverdece 2022–2035**, adopted through **Decreto 555 de 2021**, reinforces the city's broader sustainability and land-use framework.[21] While the POT is not a charging policy in itself, it matters because shared urban charging depends on how cities organize land use, mobility systems, parking, redevelopment, and mixed-use urban space.

Taken together, these instruments make Bogotá the strongest city case for the paper's thesis. They show that shared urban charging can be understood as part of a larger mobility-and-space system, not only as a building-level requirement.

At the same time, Bogotá should not be treated as a completed model. The fact that the city has strong planning instruments does not by itself guarantee clear deployment pathways. As synthesized in **Annex B**, the Bogotá engagement process points to recurring friction around awareness of rules, practical compliance, communal electrical conditions, and shared/public-area charging. In other words, Bogotá shows that policy integration is necessary, but not sufficient.

4.4 Cali: Relevant Policy Progress, Weaker Urban Charging Conditions

Cali also provides an important policy case, but one with a less mature enabling environment. The city's official planning portal states that **Decreto Municipal 4112.010.20.0332 de 2019** updated the **Plan Integral de Movilidad Urbana (PIMU)** originally adopted in 2008, incorporated the parking plan, and aligned the mobility instrument with the city's POT. The same public source frames the PIMU around sustainable mobility principles, including accessibility, lower social and environmental cost modes, climate alignment, and sustainable urban development.[22]

[21] Bogotá, Decreto 555 de 2021 – POT Bogotá Reverdece 2022–2035. Official Bogotá public information confirming adoption of the POT. (Bogotá.gov.co)
[22] Alcaldía de Santiago de Cali, Actualización del Plan Integral de Movilidad Urbana (PIMU). Official Cali page confirming that Decreto 4112.010.20.0332 de 2019 updated the PIMU, incorporated the parking plan, and aligned it with the POT. (Cali)

This is meaningful progress. It shows that Cali has already embedded mobility sustainability within formal planning and has linked mobility planning to parking and land-use considerations. The city's **POT 2014** also remains relevant because it is the main territorial-development guide for how projects, infrastructure, and urban growth are organized.

However, based on the city-level picture compiled in **Annex A** and the stakeholder synthesis in **Annex B**, Cali's enabling environment appears less consolidated than Bogotá's. The city has relevant policy instruments, but weaker evidence of an integrated charging ecosystem. The practical conditions required for shared urban charging—clear implementation routes, strong institutional articulation, mature infrastructure planning, and broad market confidence—appear more limited.

This does not make Cali a weaker analytical case. On the contrary, it makes Cali highly useful because it illustrates the conditions likely to be found in many Colombian cities outside the capital: policy interest exists, but implementation conditions remain fragmented and dependent on stronger coordination, updated rules, and targeted support.

4.5 Cross-Cutting Gaps in the Enabling Environment

Across the national and local levels, four cross-cutting gaps define the current enabling environment.

The first is an **implementation gap**. Colombia already has national legal obligations and city-level policy frameworks, but the conversion of these instruments into charging-ready buildings, interoperable stations, and shared-use deployment models remains incomplete. This is visible in the contrast between the formal framework compiled in **Annex A** and the action-oriented implementation needs laid out in **Annex D**.

The second is a **coordination gap**. Shared urban charging sits at the intersection of transport, energy, housing, urban planning, parking, and private service provision. National rules alone cannot resolve this. The implementation framework summarized in **Annex D** is therefore important because it explicitly identifies the need for interinstitutional coordination, regional boards, and public-private implementation mechanisms.

The third is a **technical-operational gap**. Recent regulation has advanced interoperability and clarified the treatment of charging service, but many operational issues still need clearer pathways: adaptation of existing buildings, treatment of co-owned properties, alignment with parking systems, responsibility for common-area installations, and integration with urban deployment models. These are not fully resolved by the current legal framework, even though parts of the framework are already advanced.

The fourth is a **market-readiness gap**. National policy now clearly supports electric mobility, but scalable deployment still depends on business models, financing, and confidence among host sites, operators, and users. This is why the implementation matrix in **Annex D** gives significant weight to incentives, credit lines, governance, and capacity building, rather than treating infrastructure as a purely technical issue.

4.6 Overall Assessment

The overall diagnosis is therefore mixed but clear.

Colombia already has many of the formal components required to support electric mobility: national ambition, legal recognition, charging-specific regulation, city-level mobility planning, and emerging interoperability rules. This is a significant advantage and should be recognized as such.

However, the enabling environment for **shared urban charging** is still **necessary but not yet sufficient**. The framework is strategically advanced, but operationally uneven. It is stronger on policy direction than on execution; stronger on formal recognition than on implementation pathways; and stronger in Bogotá than in more weakly articulated urban contexts. That conclusion emerges from the interaction of the public-source framework reviewed in **Annex A**, the city-level and stakeholder synthesis in **Annex B**, and the implementation pathway compiled in **Annex D**.

For that reason, the central policy problem is no longer whether Colombia should support electric mobility. It is whether Colombia can strengthen the legal, technical, institutional, and market conditions required to make **shared urban charging** deployable at scale.

5. Key Barriers to Shared Urban Charging Deployment

5.1 Overview

The diagnosis in Chapter 4 shows that Colombia already has a substantial policy and regulatory foundation for electric mobility, but that this foundation is not yet sufficient to support shared urban charging at the scale required. Colombia already has national laws, policy instruments, and charging-specific rules that recognize electric mobility and its infrastructure needs, yet the enabling environment remains incomplete when the objective is to deploy charging infrastructure across buildings, shared parking, co-owned properties, commercial sites, and public-facing urban environments. This conclusion follows from the interaction between the national framework compiled in **Annex A**, the stakeholder evidence synthesized in **Annex B**, and the implementation priorities structured in **Annex D**.

For the purposes of this paper, the barriers are organized into three tiers:

- **Tier 1: critical barriers**, which directly block deployment in the near term;
- **Tier 2: structural barriers**, which weaken scale, efficiency, and long-term system performance; and
- **Tier 3: enabling barriers**, which reduce capacity, confidence, and implementation readiness.

5.2 Tier 1 – Critical Barriers

5.2.1 Weak implementation of existing legal obligations

The first critical barrier is the gap between **formal legal obligations** and **actual implementation**. Colombia already has binding provisions that connect electric mobility to buildings and parking, particularly through **Law 1964 of 2019**, which promotes electric and zero-emission vehicles and includes requirements related to charging access and supporting infrastructure in new buildings. In principle, this should give the country a significant advantage: the framework links charging readiness not only to transport ambition, but also to the built environment.[23]

In practice, however, the existence of these obligations has not yet produced consistent deployment conditions. As synthesized in **Annex B**, stakeholder engagement points to confusion around requirements, weak compliance, and difficulties translating legal obligations into functioning infrastructure in residential, commercial, and shared-use environments. This is especially relevant in parking spaces, shared buildings, and public-facing sites, where infrastructure obligations are often easier to recognize formally than to execute operationally.

This is a critical barrier because it means Colombia's regulatory framework is stronger **in design** than **in execution**. Where implementation is inconsistent, developers, administrators, host sites, and local actors cannot reliably anticipate what compliance requires, how it should be verified, or how it should be financed. The implementation matrix in **Annex D** reflects this directly by prioritizing regulatory strengthening, verification mechanisms, and clearer compliance pathways.

5.2.2 Uncertainty in horizontal property and shared-use environments

A second critical barrier is the uncertainty surrounding **horizontal property**, collective-use buildings, and other shared environments. This is especially important because the paper's thesis is centered on **shared urban charging**, and many of the most relevant charging-demand

[23] República de Colombia, Ley 1964 de 2019. Public legal text establishing measures to promote electric vehicles and related charging infrastructure obligations. https://www.suin-juriscol.gov.co/viewDocument.asp?id=30036636

settings in Colombia are precisely those where ownership, parking, governance, and electrical infrastructure are shared among multiple actors.

Public regulatory interpretation has clarified part of this terrain. **SSPD Concepto 100 de 2025** states that EV charging constitutes a **servicio de carga**, not a domiciliary public service, and that horizontal-property issues must be analyzed under **Ley 675 de 2001** and the internal rules of each co-ownership regime. This is an important clarification because it helps distinguish charging-service provision from public-utility regulation and confirms that co-owned environments require specific governance treatment.[24]

Even so, legal clarification has not removed the operational uncertainty faced by co-owned properties, administrators, and host sites. As reflected in **Annex B**, the residential-segment webinar identified recurring concerns around common-area installations, electrical overload, maintenance responsibility, billing complexity, internal decision-making, RETIE compliance, and the ability of a communal system to scale as EV adoption grows. These issues are often where deployment stalls in practice.

For that reason, uncertainty in shared-use environments is not simply a legal nuance. It is a direct deployment barrier affecting some of the very settings where shared urban charging is most needed.

5.2.3 Lack of clear and predictable compliance pathways

A third critical barrier is the absence of sufficiently clear **compliance pathways** for different site types. National law and ministerial regulations establish important obligations and market conditions,[25][26] but the route from legal rule to real project implementation remains too uncertain across many practical settings.

This problem is especially acute for:

- existing buildings,
- mixed-use developments,
- co-owned residential complexes,
- commercial sites with shared parking,
- and public-facing or quasi-public urban spaces.

[24] Superintendencia de Servicios Públicos Domiciliarios (SSPD), Concepto 100 de 2025. Public interpretive guidance clarifying the legal treatment of EV charging service and its relation to horizontal-property regimes. https://gestornormativo.creg.gov.co/gestor/entorno/docs/concepto_superservicios_0000100_2025.htm

[25] Ministerio de Minas y Energía, Resolución 40223 de 2021.https://normativame.minenergia.gov.co/normatividad/325/norma/

[26] [4] Ministerio de Minas y Energía, Resolución 40123 de 2024. Official text establishing interoperability conditions for public-access charging stations. https://www.suin-juriscol.gov.co/clp/contenidos.dll/Resolucion/30051458

Resolution 40223 of 2021 established minimum standardization and market conditions for charging infrastructure, while **Resolution 40123 of 2024** established interoperability conditions for public-access charging stations. These are meaningful advances, but interoperability rules and market definitions alone do not tell site owners, administrators, designers, utilities, or local authorities exactly how a project should move from pre-installation requirement to charger deployment, shared metering, operation, maintenance, and user access.

This is why **Annex D** places such strong emphasis on normative strengthening, technical regulations, and compliance verification. The central issue is not that Colombia has no rules. It is that many actors still lack a **clear, practical, and predictable route** for applying them in specific urban contexts.

5.2.4 Financing constraints at the point of deployment

A fourth critical barrier is financing. Shared urban charging often depends on investments that do not fit neatly within traditional real-estate budgets, public budgets, or household spending decisions. Even where the long-term value proposition may be positive, the initial investment decision is frequently blocked by uncertainty over demand, revenue, asset ownership, operating responsibility, and cost allocation.

This matters especially in:

- residential communities,
- commercial buildings,
- mixed-use developments,
- small fleet environments,
- and shared public-facing sites where no single actor captures the full value of the investment.

The implementation framework summarized in **Annex D** treats this issue as central by prioritizing green credit lines, tax incentives, and business models capable of mobilizing private capital into charging infrastructure. This means the barrier is not simply lack of money. It is lack of **bankable, trusted, and replicable deployment structures**.

5.3 Tier 2 – Structural Barriers

5.3.1 Incomplete technical standardization

A major structural barrier is incomplete technical standardization. Colombia has advanced through **Resolution 40223 of 2021** and **Resolution 40123 of 2024**, particularly on definitions, market conditions, interoperability, and charging-station operation. This is an important regulatory step.

But shared urban charging depends on a broader technical ecosystem than interoperability alone. Scale also requires predictable approaches to:

- electrical adaptation,
- protection and safety systems,
- metering and billing,
- retrofit conditions,
- common-area installations,
- user authentication and access,
- operation and maintenance responsibilities,
- and integration with existing parking and building infrastructure.

Where technical pathways remain fragmented, project costs rise, approval processes slow down, and market actors become more risk-averse. In that sense, incomplete standardization is not merely a technical inconvenience. It is a structural barrier that weakens the efficiency and scalability of the entire charging ecosystem.

5.3.2 Weak alignment between charging policy and urban systems

A second structural barrier is the insufficient alignment between charging policy and wider **urban systems**. Shared charging does not exist independently of cities. It depends on how cities organize parking, circulation, land use, mixed-use development, logistics, public space, and implementation authority.

Bogotá has made more progress than most Colombian cities in integrating mobility, sustainability, and urban planning through the **PMSS**, **CONPES D.C. 30 de 2023**, and the **POT Bogotá Reverdece**. Cali also has formal mobility and territorial instruments through its updated **PIMU** and **POT**. But the existence of those instruments does not automatically mean that charging is fully embedded as an operational infrastructure layer within them.

This is a structural issue because the success of shared urban charging will depend on whether it is treated as:

- part of parking planning,
- part of building and site adaptation,
- part of urban-service infrastructure,
- and part of city-level implementation strategy.

Where this alignment is weak, charging remains an add-on rather than a system component. The gap between city policy and deployable urban infrastructure is therefore a barrier in itself.

5.3.3 Grid-readiness and network visibility constraints

A third structural barrier concerns electricity networks and grid-readiness. Shared charging infrastructure requires confidence not only that chargers can be installed, but that connection conditions, load growth, and upgrade needs can be anticipated and managed over time.

This barrier appears in two forms. The first is technical: actual network capacity, adaptation requirements, and site-upgrade costs may be difficult for host actors to assess in advance. The second is institutional: utilities, regulators, municipalities, and developers do not always operate with sufficiently integrated planning timelines or transparent information pathways for distributed charging expansion.

This issue is recognized indirectly through the regulatory treatment of EV charging as a distinct topic within the energy sector, including through the CREG thematic gateway on **vehículos eléctricos, estaciones de carga**. It is also reflected in **Annex D**, which places infrastructure expansion and grid modernization within the implementation agenda. Shared urban charging will remain difficult to scale if network conditions remain opaque, reactive, or poorly coordinated.

5.3.4 Fragmented business-model ecosystem

A fourth structural barrier is the still-fragmented business-model ecosystem for charging deployment. Shared charging needs more than equipment suppliers. It needs viable models for:

- ownership,
- third-party operation,
- cost recovery,
- revenue sharing,
- service management,
- and coordination between site hosts and charging operators.

Public regulation has progressed in clarifying charging as a distinct service and in improving interoperability conditions,[2][3][4] but the broader market environment for scalable service models is still developing. This is why the paper places such importance on public-private deployment logic: the market is not only waiting for more demand; it is also searching for reliable operating structures. That is a structural barrier because without those structures, infrastructure remains difficult to finance and replicate.

5.4 Tier 3 – Enabling Barriers

5.4.1 Limited awareness and weak practical understanding

The first enabling barrier is limited awareness. As synthesized in **Annex B**, stakeholder engagement repeatedly identified misinformation, confusion, and lack of practical understanding around regulations, shared charging, and the implications of EV adoption for buildings and communities.

This matters because even a relatively advanced regulatory framework will underperform if:

- administrators do not understand their obligations,
- property owners fear technical or legal exposure,
- users do not trust communal charging arrangements,
- and host sites do not understand the available business models.

This is why **Annex D** gives significant weight to training, civic culture, and technical formation. Awareness is not peripheral to infrastructure deployment. It is part of the enabling environment itself.

5.4.2 Limited technical and institutional capacity

A second enabling barrier is the shortage of practical capacity among the actors who must make the system work. This includes:

- project designers,
- builders,
- administrators,
- municipal teams,
- utility-facing actors,
- and operators responsible for implementation and maintenance.

Charging systems in shared settings require technical and organizational capabilities that are still emerging in many parts of the Colombian ecosystem. Public policy can mandate direction, but deployment still depends on the people and institutions that interpret, approve, design, install, manage, and maintain the infrastructure. This is why **Annex D** includes training and institutional coordination as central implementation axes rather than secondary support measures.

5.4.3 Weak confidence in long-term usability and governance

A third enabling barrier is weak confidence in the long-term usability and governance of shared charging systems. This is especially relevant in residential communities and other shared-use settings. Even where there is interest in EV charging, stakeholders often remain unsure about:

- who decides,
- who pays,
- who operates,
- who maintains,
- and how future growth in demand will be managed fairly.

This is not identical to the legal uncertainty described in Tier 1. It is a confidence and governance barrier: even where legal clarification exists, adoption may still lag if actors do not trust the practical durability and fairness of the model.

5.5 Barrier Interaction and Why It Matters

These barriers do not operate independently. They reinforce one another.

- Weak compliance makes investors cautious.
- Technical uncertainty makes host sites delay decisions.
- Lack of financing makes standards harder to adopt in practice.
- Weak awareness increases resistance in shared-use settings.
- Limited urban-system integration keeps charging fragmented rather than networked.

That interaction is why shared urban charging cannot be unlocked through a single intervention. More chargers alone will not solve the problem. More regulation alone will not solve it either. The challenge is systemic: legal, technical, urban, financial, and organizational barriers combine to slow deployment even when policy ambition is already present.

5.6 Conclusion

The barrier picture is therefore clear.

The most immediate obstacles are weak implementation of existing obligations, uncertainty in shared-use environments, unclear compliance pathways, and financing constraints. Beyond these lie structural barriers around standardization, urban-system integration, grid-readiness, and business-model fragmentation. Beneath all of them sit enabling barriers related to awareness, capacity, and confidence.

This means the next stage of Colombia's electric mobility transition is not primarily about declaring new ambition. It is about making shared urban charging **implementable, investable, and governable**.

6. Technical Analysis: Shared Urban Charging Systems

6.1 Overview

If the central challenge identified in this paper were simply the lack of policy ambition, the response would be straightforward: adopt more ambitious targets, incentives, or planning instruments. But Colombia has already moved beyond that stage. The country has a national legal and policy basis for electric mobility, charging infrastructure, and transport decarbonization, including **Law 1964 of 2019**, **Law 2169 of 2021**, **CONPES 3934 of 2018**, **CONPES 4075 of 2022**, and more recent ministerial rules on charging infrastructure and interoperability.

The technical problem is different. The issue is that many actors still lack clarity on **what shared urban charging requires in practice**. That confusion appears at the level of buildings, co-owned properties, parking systems, public-facing spaces, site adaptation, metering, interoperability, operation, and long-term governance. As a result, the technical challenge is not simply installing more chargers. It is designing and operating charging systems that can function in real Colombian urban conditions.

This chapter therefore examines the technical dimension of the enabling environment. It asks how shared urban charging should be understood as a system, what technical and design conditions it requires, and how technical-reference and certification pathways—summarized in **Annex C**—can help reduce confusion and improve implementation consistency. These are also the conditions that any viable shared charging model in Colombia must be able to address, including market-based partnership models such as **MubOn**, which are intended to operate across shared urban environments rather than only in isolated single-user settings.

6.2 Buildings as Entry Points, Not the Whole System

Buildings remain a critical part of the charging ecosystem because they are often the first physical locations where charging demand emerges. **Law 1964 of 2019** is especially important in this respect because it links electric mobility to the built environment by requiring new residential and commercial buildings, under its scope, to provide electrical access and supporting infrastructure for EV charging. That legal connection is one of the strongest features of Colombia's framework.

At the same time, buildings should not be treated as the entirety of the charging problem. Shared urban charging extends beyond building-by-building compliance. In practice, it also includes:

- co-owned residential complexes,
- mixed-use developments,
- office and retail parking,
- shared private parking assets,
- and public-facing or quasi-public locations where access is not limited to a single user or owner.

That distinction matters technically. A private single-user charger in a detached setting raises a different design problem from a shared charging system in a residential tower, a mixed-use building, or a parking facility serving multiple users. Shared-use contexts require a more complex system logic: access control, load management, billing allocation, user prioritization, maintenance rules, and future expandability all become part of the design problem.

This is why the paper uses the term **shared urban charging** rather than simply EV-ready buildings. Buildings are often the entry point, but the technical question is how to make charging function in settings where infrastructure, governance, and energy use are shared.

6.3 Core Technical Requirements for Shared Urban Charging

At a minimum, shared urban charging requires more than the physical presence of a charger. It requires a set of conditions that make the infrastructure usable, safe, expandable, and governable over time.

The first requirement is **electrical readiness**. This includes the basic availability of electrical service access, circuit planning, protection systems, and the physical routing required to support present and future charging points. In Colombian law, this issue is already anticipated through the requirement for electrical access and supporting infrastructure in new buildings. But the gap identified throughout the paper is that legal requirement does not automatically produce a consistent design standard on the ground.

The second requirement is **site readiness**. This includes how the charger is integrated into parking layouts, circulation, vehicle access, signage, user safety, and future expansion. A charger installed in an isolated technical corner is not equivalent to a charger integrated into a functioning shared parking system. Design decisions about parking configuration, circulation paths, conflict points, and reserved or flexible space use directly affect whether a site can operate as a shared charging environment.

The third requirement is **operational readiness**. A shared charging site must have a clear logic for user access, authentication, load management, billing, maintenance, and fault response. This is one of the main implementation gaps in Colombian practice: many discussions still treat charging as equipment, when in fact a usable shared charging system is also an operating system.

The fourth requirement is **expandability**. Shared urban charging sites should not be designed only for current demand. They need a pathway for future scale-up without requiring full reconstruction every time EV adoption increases. This is why EV-ready design is so important: a site that is prepared technically for expansion is not forced to restart from zero every time new users enter the system.

These requirements are not optional refinements. They are what separates symbolic compliance from functional infrastructure.

6.4 Horizontal Property and Shared Governance as Technical Design Conditions

One of the clearest lessons from the evidence base is that **horizontal property** should not be treated only as a legal problem. It is also a technical design problem.

The **SSPD Concepto 100 de 2025** clarifies that EV charging is a **servicio de carga**, not a domiciliary public service, and that horizontal-property issues must also be examined under the framework of **Ley 675 de 2001** and the specific rules of each co-ownership regime.[27] This is an important legal clarification. But it also has direct technical implications.

In a co-owned property or residential community, technical design must address:

- common-area versus private-area installation,
- routing of electrical infrastructure,
- metering and allocation of consumption,
- maintenance access,
- user access permissions,
- load growth over time,
- and the ability to add future charging points without creating technical or governance conflict.

This is precisely why residential EV charging can become a point of confusion. The challenge is not simply whether a charger can be connected. The challenge is whether the charging system

[27] Superintendencia de Servicios Públicos Domiciliarios (SSPD), Concepto 100 de 2025. Public interpretive guidance on EV charging service and horizontal-property regimes.
https://gestornormativo.creg.gov.co/gestor/entorno/docs/concepto_superservicios_0000100_2025.htm

can be integrated into a shared building environment in a way that remains fair, safe, and manageable as adoption grows.

For that reason, technical design in shared settings should be understood as **governance-aware design**. A technically elegant solution that ignores co-ownership decision rules, administrator responsibilities, billing logic, or maintenance access is not a real solution. In shared urban charging, governance is part of technical functionality.

6.5 Commercial, Mixed-Use, and Shared Parking Environments

Commercial and mixed-use environments raise a related but distinct set of technical issues. Unlike purely residential settings, these spaces often involve:

- multiple user types,
- variable parking duration,
- turnover-based access,
- different operating hours,
- and a stronger need to coordinate customer access with host-site business interests.

This makes them especially relevant to shared urban charging. A charger in a commercial or mixed-use context is rarely a private amenity. It is usually part of a wider access ecosystem that includes host-site management, customer circulation, parking logic, visibility, payment, and operational control.

City-level planning instruments reinforce the importance of this dimension. Bogotá's **PMSS**, together with its supporting technical package and parking master plan, indicates that mobility infrastructure must be read as part of a broader urban system rather than as isolated assets.[8] The same logic is relevant in Cali, where the updated **PIMU** and parking integration indicate that mobility and parking should be treated in connection with wider urban planning.[9]

This means technical design in shared parking environments should account for more than electrical installation. It should also address:

- turnover and dwell time,
- charger visibility and placement,
- queue and circulation logic,
- compatibility with host-site parking management,
- user information,
- and the possibility of future interoperability with wider charging networks.

Where these issues are ignored, charging infrastructure risks underutilization, conflict with parking operations, or restricted access that undermines the rationale for shared deployment.

6.6 Public-Facing and Quasi-Public Urban Charging

Shared urban charging also includes public-facing and quasi-public locations such as publicly accessible parking, institutional sites, commercial lots, transport-adjacent spaces, and other environments where use is not restricted to a single owner or resident group.

Here, the technical challenge becomes even more systemic. Public-facing charging depends not only on site readiness, but also on:

- interoperability,
- transparent user access,
- communication protocols,
- visible pricing,
- reliability,
- and alignment with public or semi-public space management.

This is where **Resolution 40123 of 2024** becomes especially important. The resolution establishes interoperability conditions for public-access charging stations and requires the use of open communication protocols, together with rules on operational scope and price transparency. Technically, this matters because public-facing charging cannot scale effectively if every station operates as a closed, isolated, non-transparent island.

In other words, public-facing charging requires infrastructure that works as part of a network, not merely as a piece of hardware. That network logic is central to the paper's thesis. Shared urban charging succeeds when multiple sites can be integrated into a wider service environment that reduces friction for users and increases confidence for operators and hosts.

6.7 Metering, Billing, Access, and Operation

One of the biggest sources of implementation confusion is the tendency to frame charging as installation only. In reality, shared urban charging depends just as much on **metering, billing, access control, and operation** as on physical equipment.

The regulatory framework has already moved in this direction. **Resolution 40223 of 2021** established definitions, standardization criteria, and market conditions for charging infrastructure,[5] and **Resolution 40123 of 2024** advanced interoperability requirements for public-access charging stations. These are important steps because they recognize charging as a service ecosystem, not just an electrical appliance.

From a technical perspective, this means a functioning shared charging system must answer at least four operational questions:

- Who can use the charger?
- How is energy consumption measured and attributed?
- How is payment or cost allocation handled?
- Who is responsible for maintenance, uptime, and user support?

These questions become even more important in:

- co-owned residential buildings,
- commercial sites with multiple user groups,
- shared parking facilities,
- and public-facing sites with variable users.

Technical design that does not resolve these issues in advance tends to generate confusion later, often at the governance or user level. That is why the paper treats metering, billing, access, and operation as core technical requirements rather than downstream commercial questions.

6.8 Design Standards and Certification Pathways

The practical question, then, is how to reduce implementation confusion. One of the strongest answers provided by this paper is that **design standards and certification pathways can serve as translation mechanisms** between regulatory intent and real-world implementation.

As shown in **Annex C**, the value of these frameworks is not that they replace regulation. Their value is that they convert broad ambition into more concrete requirements, thresholds, and pathways.

Three pathways are especially important.

The first is **LEED**, because it already includes EV-related design logic for buildings and communities. As summarized in **Annex C**, LEED provides practical thresholds for charger installation and EV-ready spaces in new buildings, while also extending mobility and clean-transportation logic to existing buildings and city/community scales. This makes LEED the strongest mature benchmark for reducing ambiguity in design and site preparation.

The second is **CASA Colombia**, especially through **EB2 Movilidad**. As Annex C shows, EB2 already provides concrete criteria for residential communities and co-owned settings, including recognition of EV charging access, EV-ready spaces, and installed chargers. This is especially important because residential communities are one of the environments where implementation confusion is greatest. CASA therefore offers an important domestic pathway for practical standardization.

The third is **Envision**, which is valuable because it broadens the lens beyond buildings. Shared urban charging is also an infrastructure issue, and Envision helps position charging within wider sustainable-transport and infrastructure-innovation logic. This is particularly relevant for public-facing charging, shared parking, and urban-system integration.

Together, these pathways can help close one of the paper's core gaps: the distance between **regulatory willingness** and **practical implementation clarity**.

6.9 Implications for Reform and Implementation

The technical analysis in this chapter leads to a clear conclusion: Colombia does not need to invent shared urban charging from scratch. Many of the building blocks already exist:

- legal obligations,
- charging-specific regulations,
- interoperability rules,
- planning instruments,
- and technical-reference pathways.

The problem is that these pieces are still not sufficiently integrated into a clear and predictable implementation environment.

That suggests five priorities.

- First, technical requirements should be made more explicit and more site-specific, especially for residential communities, mixed-use projects, commercial parking, and retrofits.
- Second, co-owned and shared-use environments should be treated as priority cases, not special exceptions, because they are among the most important demand environments in Colombian cities.
- Third, operational design should be recognized as part of technical design. Metering, billing, access, maintenance, and scalability are not optional add-ons.
- Fourth, certification and technical-reference pathways should be used strategically to reduce ambiguity and support compliance, especially where Colombian regulation is still general or fragmented.
- Fifth, city-level implementation should align charging with parking, land use, mobility planning, and public-space management rather than treating it as a stand-alone energy issue.

6.10 Conclusion

The technical challenge of shared urban charging is not simply installing equipment. It is building systems that can function across the real conditions of Colombian cities: shared ownership, mixed uses, parking constraints, variable access, public-facing demand, and growing EV adoption.

Colombia has already demonstrated regulatory willingness to support electric mobility.[1][2][3][4][5][6] The remaining challenge is to turn that willingness into technical clarity. That requires clearer requirements, more predictable design pathways, stronger operational models, and the strategic use of certification and technical-reference systems to reduce confusion where the law alone is not enough.

These technical requirements provide the basis for assessing, in the next chapter, how the **MubOn partnership** contributes to reducing implementation confusion and strengthening the enabling environment for shared urban charging.

7. Partnership Contributions to Strengthening the Enabling Environment

7.1 Overview

The previous chapters established that Colombia already has a meaningful legal and policy foundation for electric mobility, but that the enabling environment for **shared urban charging** remains incomplete in practice. The problem is no longer only one of policy direction. It is one of implementation: how to translate regulatory willingness into deployable systems that can function across residential, commercial, mixed-use, and public-facing urban settings.

This is where the partnership becomes relevant. The value of the MubOn partnership lies not only in the deployment of charging infrastructure itself, but in its ability to function as a **market-facing implementation platform** within a still-evolving regulatory and urban environment. In other words, the partnership contributes not merely by supplying charging points, but by testing how shared charging models can operate under real Colombian conditions and by generating evidence about what still prevents scale.

As discussed in earlier chapters, this is also consistent with **P4G's approach**, which explicitly combines business support, investment readiness, and enabling-systems improvement. The partnership should therefore be understood as both a deployment effort and a structured contribution to the broader regulatory and implementation agenda for shared urban charging.

7.2 Contribution Through Market Validation

A first contribution of the partnership is **market validation**. One of the central barriers identified in Chapters 4 and 5 is that many host sites, administrators, investors, and local actors still lack confidence in how shared charging can function in practice. This is especially true where infrastructure, access, governance, and revenue are shared across multiple users.

The official P4G partnership profile describes MubOn as developing a **cost-effective model for installing intelligent EV charging infrastructure** in Colombia, specifically aimed at addressing scarcity of charging points, limited installation space in residential and commercial areas, and the low adaptability of conventional charging systems. That framing is important because it positions MubOn not as a generic charger provider, but as a response to the exact type of implementation friction this paper has identified.

P4G's public description also states that MubOn's collaborative model reduces the high initial costs of buying and installing a charger and avoids extensive infrastructure modifications, while generating revenue from energy sales shared between multifamily units and MubOn. This is directly relevant to the barrier analysis in Chapter 5. It means the partnership contributes not only through technology, but through a concrete attempt to make shared charging financially and operationally workable in the kinds of urban environments where conventional models often fail.

In that sense, the partnership contributes to the enabling environment by showing that shared charging can be structured as an investable and replicable service rather than as a one-off infrastructure expense.

7.3 Contribution Through Evidence Generation

A second contribution of the partnership is **evidence generation**. Shared urban charging suffers from an implementation gap partly because policy and regulation often advance faster than practical understanding on the ground. One of the most valuable roles of the partnership is therefore its capacity to generate grounded evidence about how barriers actually appear in deployment settings.

The official P4G profile states that MubOn hosted **three workshops in Cali and Bogotá** to identify infrastructure-deployment challenges and user priorities in both cities, and that the partnership's research identified **cultural, technological, and financial barriers affecting EV adoption**. That matters because one of the recurring weaknesses in electric-mobility policy is that legal provisions are often not tested against the practical realities of buildings, parking systems, co-owned properties, and user behavior.

As synthesized in **Annex B**, the stakeholder-engagement process surfaced recurring issues around misinformation, outdated norms, communal electrical networks, technical compliance, safety concerns, and weak understanding of shared charging in residential and commercial settings. The partnership's contribution here is not that it solved all of these barriers at once. Its contribution is that it helped make them visible in a structured, actionable way.

This is especially important for a technical paper such as this one. The recommendations developed later in the paper are stronger because they are not based only on abstract policy review; they are informed by a partnership process that exposed where the friction actually lies.

7.4 Contribution Through Policy and Standards Interface

A third contribution of the partnership is at the interface between **market deployment and policy improvement**. P4G states clearly that partnerships are expected to identify barriers to scaling and develop policy and regulatory recommendations to improve enabling systems. The MubOn partnership fits that logic directly.

According to the official P4G partnership page, one of the stated goals of the partnership period is to improve **regulatory standards and policy frameworks**, particularly the minimum conditions required to install private stations in multifamily units and the interoperability between charging actors. This is highly consistent with the diagnosis of this paper. Two of the most important unresolved issues identified earlier are precisely:

- the unclear treatment of charging in shared and co-owned settings, and
- the need for stronger interoperability and operational clarity.

The same official profile also states that the Colombian Council for Sustainable Construction (CCCS) is preparing a **public policy action plan** and a **proposal to include EV charging infrastructure as part of sustainability standards for new and existing buildings**.[5] This is a significant contribution because it connects the partnership to two of the paper's most important solution pathways:

- implementation reform, and
- technical/certification pathways.

In other words, the partnership does not only reveal problems; it also helps translate them into specific reform channels.

7.5 Contribution Through Urban and Multi-Site Learning

A fourth contribution of the partnership is that it generates **urban and multi-site learning**. Shared urban charging is not a single-use-case problem. It behaves differently in multifamily

housing, commercial properties, shared parking environments, fleet-related settings, and public-facing sites. A valuable feature of the partnership is that it is not confined to one type of site.

The P4G profile states that MubOn has expanded its charging network with installations across **Bogotá, Medellín, Cali, and Villavicencio**, and that its growth strategy has moved beyond residential complexes into **shared spaces such as shopping centers, universities, and hospitals**. This is important analytically because it shows that the partnership is operating across multiple urban contexts and customer environments rather than limiting itself to a single pilot niche.

That matters for the enabling environment because a city or national framework is only truly enabling if it can support charging across different urban use cases. A deployment model tested only in one segment may have limited policy relevance. A model that is tested across residential, commercial, and institutional settings can generate much more useful lessons for regulation, standards, planning, and investment.

7.6 Contribution Through Investment Readiness and Scale Logic

A fifth contribution is the strengthening of **investment readiness and scale logic**. A recurring theme in this paper is that shared charging remains difficult to scale when infrastructure is treated as an isolated technical installation rather than as part of a commercially viable service model.

P4G's public materials emphasize this point directly. The P4G approach is designed to help early-stage climate businesses become **investment ready** through grants, technical assistance, and enabling-systems work. The MubOn partnership profile states that the company has strengthened its investment readiness by updating its financial model, advancing its fast-charging infrastructure plans, expanding its product roadmap, and creating an investor data room.

This is relevant to the enabling environment because investment readiness is not only a business milestone; it is also part of market-system development. When a charging model becomes clearer to investors, partners, host sites, and regulators, the broader charging ecosystem becomes easier to finance and replicate. The partnership therefore contributes to the enabling environment by reducing the distance between policy ambition and investable infrastructure models.

7.7 Contribution Through Inclusion, Capacity, and Ecosystem Development

A sixth contribution is ecosystem-building. P4G's public approach places strong emphasis on enabling systems, partnership learning, and broader impact beyond the lead business. The

MubOn profile reflects that same logic. It states that the partnership will grow the ecosystem database, support startup teams and mentors, and work with **ICESI University** on training and a digital tool to reduce misinformation across the country.

This is directly relevant to the barrier architecture in Chapter 5, where limited awareness, capacity, and confidence were identified as enabling barriers. Shared urban charging will not scale through regulation and infrastructure alone. It also requires:

- actors who understand the model,
- technical personnel who can implement it,
- institutions that can coordinate it,
- and users who trust it.

The partnership therefore contributes not only through hardware deployment or policy recommendations, but also through the expansion of practical ecosystem capacity.

7.8 Limits of the Partnership Contribution

At the same time, the contribution of the partnership should not be overstated. A single partnership cannot by itself resolve all of Colombia's implementation gaps. It cannot replace binding regulation, municipal enforcement, utility coordination, or national technical standard-setting.

Its role is narrower and more useful than that. The partnership contributes by:

- testing a model under real conditions,
- surfacing practical barriers,
- providing evidence for reform,
- demonstrating operating logic,
- and improving the credibility of shared charging as a deployable market solution.

This distinction matters. The partnership is not an enabling environment. It is one of the mechanisms through which the enabling environment can be better understood and strengthened.

7.9 Conclusion

The partnership's contribution to the enabling environment is therefore both practical and strategic.

It is practical because it demonstrates a shared charging model in real urban settings, lowers some of the barriers associated with upfront cost and operational complexity, and generates

evidence about how deployment actually works. It is strategic because it aligns with **P4G's enabling-systems model**, contributes to policy and standards discussions, and helps bridge the distance between Colombia's high-level regulatory willingness and the implementation confusion that still characterizes charging deployment on the ground.

That is the relevance of MubOn within this paper. Its value is not simply that it installs chargers. Its value is that it helps reveal, test, and reduce the conditions that still prevent shared urban charging from scaling in Colombia.

8. Recommendations for Strengthening the Enabling Environment

8.1 Overview

The previous chapters show that Colombia does not face a vacuum of policy ambition. The country already has national laws, climate-policy alignment, green-growth and energy-transition instruments, and specific charging-related rules, including market conditions and interoperability requirements. The central problem is different: the current framework is still not sufficiently clear, coordinated, and operational to support **shared urban charging at scale**.

The purpose of this chapter is therefore not to propose an entirely new policy direction. It is to identify the priority actions that would help convert Colombia's existing regulatory willingness into a more predictable and implementable environment for charging deployment in real urban conditions. These recommendations draw on:

- the national and city-level framework reviewed in **Annex A**,
- the stakeholder evidence synthesized in **Annex B**,
- the technical and certification pathways organized in **Annex C**,
- and the implementation structure compiled in **Annex D**.

For clarity, the recommendations are organized across three horizons:

- short-term actions (0–3 years),
- medium-term reforms (3–5 years),
- long-term structural measures (5–10 years).

8.2 Short-Term Actions (0–3 Years)

8.2.1 Clarify compliance pathways for buildings, parking, and shared-use settings

The first short-term priority is to clarify how existing obligations are meant to be implemented in practice. **Law 1964 of 2019** already links electric mobility to parking and building readiness, but

the evidence summarized in **Annex B** shows that confusion remains widespread, especially in residential, commercial, and shared-use settings.

The immediate need is therefore not only more regulation, but more **usable regulation**. National authorities should issue technical guidance that translates legal obligations into practical compliance pathways for:

- new residential buildings,
- new commercial and mixed-use projects,
- retrofits in existing buildings,
- co-owned residential complexes,
- shared parking assets,
- and public-facing parking environments.

These pathways should specify minimum technical expectations around:

- electrical pre-installation,
- protection and safety systems,
- placement and access,
- meter allocation,
- common-area installations,
- and future expandability.

This recommendation is consistent with the implementation priorities summarized in **Annex D**, which already emphasize normative strengthening and clearer application rules.

8.2.2 Establish explicit technical guidance for horizontal property

A second immediate priority is to develop specific guidance for **horizontal property** and shared building environments. The public regulatory framework has already advanced through **SSPD Concepto 100 de 2025**, which clarifies that EV charging is a **servicio de carga** and that co-owned property questions must be read within the horizontal-property framework. That is an important legal clarification, but it is not enough to guide implementation on its own.

A practical technical-guidance package should therefore be developed for administrators, boards, developers, and installers, covering:

- common-area versus private-area charging,
- shared and individual metering options,
- responsibilities for maintenance and fault response,
- governance and decision routes within co-owned properties,
- safety and electrical protection,

- and pathways for future expansion as EV adoption increases.

This would directly address one of the strongest confusion points surfaced in **Annex B** and reduce one of the paper's most important critical barriers.

8.2.3 Strengthen enforcement of existing obligations

A third short-term priority is enforcement. Colombia already has relevant legal obligations,[1] but weak compliance undermines the credibility of the framework. Existing rules related to EV-ready conditions and designated parking spaces should therefore be linked to stronger compliance verification.

This should include:

- incorporation of EV-related checks into licensing and post-construction verification processes,
- clearer responsibility for municipal and sectoral oversight,
- and reporting mechanisms that distinguish between nominal compliance and actual charging readiness.

Without stronger verification, Colombia risks maintaining a framework in which requirements exist formally but do not reliably change the built environment.

8.2.4 Publish a practical interoperability and operational guide for shared charging

A fourth immediate priority is operational clarity. **Resolution 40123 of 2024** already establishes interoperability conditions for public-access charging stations and requires open communication protocols and price transparency. However, many actors still lack a practical understanding of how interoperability, access control, metering, user authentication, and service provision should work in shared-use settings.

A short-term measure would therefore be to publish an implementation-oriented guide that explains, in clear operational terms:

- how public-access charging should comply with interoperability expectations,
- how private shared-use charging can align with future interoperability,
- and how site hosts, operators, and users should understand access, communication, and transparency conditions.

This would help reduce confusion not only in fully public stations, but also in quasi-public and shared commercial environments where the line between private and public access is operationally important.

8.2.5 Launch priority awareness and training programs

A fifth short-term priority is awareness and training. The workshops and webinar summarized in **Annex B** show that misinformation, low confidence, and weak technical understanding remain major barriers. The implementation plan in **Annex D** also identifies training and civic culture as a strategic axis.

Immediate programs should therefore target:

- building administrators,
- property managers,
- residential boards,
- project designers,
- construction professionals,
- municipal mobility and planning teams,
- and installers and operators.

These programs should focus not only on the benefits of electric mobility, but on the practicalities of shared charging: technical readiness, governance, compliance, billing, safety, and long-term operation.

8.3 Medium-Term Reforms (3–5 Years)

8.3.1 Integrate charging more explicitly into city-level mobility, parking, and land-use planning

A medium-term reform priority is stronger city-level integration. Bogotá already has a more advanced policy environment through the **PMSS**, **CONPES D.C. 30**, and the **POT Bogotá Reverdece**, while Cali has incorporated mobility and parking within the updated **PIMU** and territorial planning framework. But city-level policy still needs to treat shared charging as a more explicit layer of urban implementation.

This means:

- integrating charging into parking strategies,
- linking charging to redevelopment and mixed-use planning,
- identifying priority public-facing and quasi-public deployment settings,
- and aligning local mobility goals with site-level implementation routes.

Where this integration is absent, charging remains an isolated add-on rather than a planned urban system component.

8.3.2 Develop stronger technical standards for retrofits and shared parking systems

A second medium-term reform priority is technical standardization for **existing buildings**, **retrofits**, and **shared parking environments**. New-building obligations are necessary, but they are not enough. Much of the future demand for charging will appear in places that were not originally designed for EV infrastructure.

Technical standards should therefore be expanded to provide clearer guidance for:

- retrofitting existing residential buildings,
- adapting commercial parking and mixed-use sites,
- integrating chargers into shared parking systems,
- and scaling from initial installations to networked multi-user charging.

This is also where **Annex C** becomes especially relevant. The paper should not assume that all technical clarity must come from regulation alone. As shown in Annex C, frameworks such as **LEED**, **EB2 Movilidad**, and **Envision** already provide useful reference points that can help translate general regulatory intent into more concrete design and implementation logic.

8.3.3 Create clearer frameworks for service-based charging models

A third medium-term priority is to strengthen the regulatory and market treatment of **service-based charging models**. One of the paper's recurring findings is that shared urban charging is often blocked not only by technical uncertainty, but by uncertainty around ownership, cost recovery, operation, and long-term responsibility.

Public policy should therefore create clearer conditions for:

- third-party ownership,
- revenue-sharing models,
- charging-as-a-service arrangements,
- and long-term service provision in residential, commercial, and mixed-use settings.

This is not about replacing competition with one model. It is about ensuring that the framework does not assume a one-user-one-asset logic in environments where shared-use service models are far more realistic.

8.3.4 Improve utility coordination and network transparency

A fourth medium-term reform priority is stronger coordination with utilities and greater visibility into network-readiness conditions. Shared charging becomes easier to deploy when site hosts and project teams can anticipate:

- likely connection requirements,
- upgrade pathways,
- network constraints,
- and likely timelines for implementation.

The CREG regulatory environment already recognizes EV charging as a distinct topic, but a more predictable deployment environment will require better coordination between regulators, utilities, municipalities, and charging operators. This is especially important for distributed urban charging growth, where each site may be modest on its own but collectively significant for local networks.

8.4 Long-Term Structural Measures (5–10 Years)

8.4.1 Mainstream shared charging into Colombian design and certification pathways

A long-term structural priority is the mainstreaming of shared charging into technical and certification systems used by the Colombian construction and infrastructure ecosystem. This is one of the clearest reform opportunities identified in **Annex C**.

Over time, Colombia should move toward:

- wider use of mature international benchmarks such as **LEED** and **Envision** as technical reference points,
- clearer domestic integration of EV-ready and shared-charging pathways into **CASA Colombia** for new housing,
- stronger residential-community guidance through the evolution of **EB2 Movilidad**,
- and closer alignment between certification criteria and regulatory implementation priorities.

This matters because certification systems can reduce ambiguity where regulation is broad. They help translate legal intention into design thresholds, infrastructure-readiness criteria, and operational expectations.

8.4.2 Build a national implementation architecture for shared urban charging

A second long-term structural priority is a stronger national implementation architecture. The implementation plan summarized in **Annex D** already points in this direction through its governance mechanisms, including an **Interinstitutional Electric Mobility Council**, regional boards, and public-private coordination mechanisms.

Over time, Colombia should institutionalize:

- regular interagency coordination,
- city-level implementation platforms,
- data and monitoring systems for charging deployment,
- and clearer links between national mobility goals, urban implementation, and infrastructure investment.

This is especially important because shared urban charging is inherently cross-sectoral. It does not sit neatly within one ministry or one municipal office. Without institutional architecture, even good policy can remain fragmented.

8.4.3 Develop a stronger financing ecosystem for distributed charging infrastructure

A third long-term priority is a more mature financing ecosystem. The implementation plan already highlights green credit lines, tax incentives, and private-capital mobilization through service models. Over the longer term, Colombia should aim to build a financing environment in which shared charging projects are more clearly understood as:

- infrastructure assets,
- service businesses,
- or hybrid urban-service platforms depending on context.

That would make it easier for developers, operators, banks, and public actors to structure investment in ways that match the real economics of deployment.

8.4.4 Treat shared urban charging as part of mobility-system modernization

A final long-term priority is conceptual as well as institutional: shared urban charging should be treated as part of **mobility-system modernization**, not only as an electrical add-on. This means embedding charging more deeply into:

- public-space planning,
- parking reform,
- mixed-use development,
- fleet transition,
- and digital mobility services.

This is the long-term shift that would bring Colombia fully beyond the current implementation gap. The goal is not just to allow charging. It is to make charging an ordinary and governable part of how Colombian cities function.

8.5 Institutional Roles and Sequencing

The recommendations above also imply a practical division of roles.

At the **national level**, ministries and regulators should prioritize legal clarification, technical standards, interoperability guidance, and utility coordination.

At the **city level**, Bogotá, Cali, and other municipalities should integrate charging more explicitly into mobility, parking, and land-use implementation.

At the **market level**, private operators, developers, administrators, and host sites should help test and refine shared-use deployment models, especially where communal governance and commercial operation intersect.

At the **technical-system level**, certification and design frameworks should be used strategically to reduce ambiguity, standardize good practice, and make compliance more practical rather than purely formal, as summarized in **Annex C**.

And at the **implementation level**, the governance and monitoring architecture summarized in **Annex D** should be used to connect ambition with execution.

8.6 Conclusion

The recommendations in this chapter are based on a simple conclusion: Colombia does not need to replace its current direction on electric mobility. It needs to make that direction more **implementable**.

That requires short-term clarification, medium-term standardization and coordination, and long-term institutionalization. It also requires treating shared urban charging not as a niche technical topic, but as a practical bridge between electric-mobility ambition and everyday urban implementation.

In that sense, the core recommendation of this paper is consistent from start to finish: Colombia's next challenge is not deciding whether to electrify mobility. It is closing the gap between regulatory willingness and implementation reality through reforms, actions, technical requirements, design standards, certification pathways, and a stronger architecture for execution.

9. Conclusion

Colombia has already demonstrated a clear policy and regulatory willingness to advance electric mobility. Over the last several years, the country has adopted a combination of green-growth policy, climate legislation, energy-transition policy, and charging-specific regulation that places it among the more advanced electric-mobility frameworks in the region. At both national and city level, the direction of travel is no longer in doubt.

The central finding of this paper is that the next challenge is not deciding whether Colombia should electrify mobility. The challenge is making that transition **implementable** in the real urban environments where charging demand will actually emerge. This is why the paper has focused on the enabling environment for **shared urban charging** rather than on electric-vehicle adoption in the abstract. The evidence reviewed in the paper shows that high-level willingness coexists with significant confusion on the ground: confusion about compliance, technical readiness, horizontal property, billing, operation, interoperability, parking, and the practical steps required to move from legal obligation to functioning charging systems.

That gap between policy ambition and implementation reality is the paper's core diagnosis. Colombia already has many of the formal building blocks needed to support electric mobility: legal recognition, strategic policy direction, city-level planning instruments, and more detailed charging rules. However, these building blocks are not yet sufficiently integrated into a predictable and operational framework for shared urban charging. As shown throughout the paper, the problem is not only regulatory incompleteness. There is also weak enforcement, insufficient technical clarity, fragmented implementation pathways, financing constraints, uneven city-level articulation, and limited confidence among the actors who must make the system work.

For that reason, the paper has argued that shared urban charging should be treated as a strategic bridge between Colombia's electric-mobility ambitions and the practical realities of urban deployment. Buildings remain a critical part of this picture, but they are not the whole picture. The future of charging in Colombian cities will depend on how infrastructure functions across co-owned residential complexes, commercial and mixed-use projects, shared parking systems, and public-facing or quasi-public urban spaces. That is why the paper has consistently moved beyond a narrow building-compliance lens and toward a wider systems perspective.

Within that context, the role of MubOn and the P4G partnership becomes clear. The partnership is relevant not simply because it deploys charging infrastructure, but because it helps test how shared charging models can function under real Colombian conditions and generates evidence on what still prevents scale. Its value in this paper is therefore analytical as well as practical: it helps reveal where the enabling environment remains incomplete and where reforms, implementation actions, and technical pathways can have the greatest effect.

The recommendations developed in Chapter 8 follow directly from that diagnosis. Colombia does not need to replace its current direction; it needs to make that direction more usable, enforceable, and scalable. That means clearer compliance pathways, stronger technical requirements, practical guidance for horizontal property, better interoperability and operational clarity, stronger city-level integration, improved utility coordination, more bankable service models, and the strategic use of design standards and certification pathways to reduce ambiguity. In short, the paper's conclusion is not that Colombia lacks ambition. It is that Colombia must now convert ambition into **implementation architecture**.

The broader implication is that the electrification of mobility in Colombia will not be achieved by regulation alone, nor by infrastructure deployment alone. It will require the coordinated evolution of law, planning, technical standards, governance, financing, and market models. Shared urban charging sits at the center of that transition because it is the place where these dimensions meet most directly in practice.

The conclusion of this paper is therefore straightforward: **Colombia's next policy frontier in electric mobility is to close the gap between regulatory willingness and implementation reality for shared urban charging**. If that gap can be narrowed through targeted reforms, implementation actions, technical requirements, design standards, certification pathways, and stronger coordination, the country will be far better positioned to translate its electric-mobility ambition into durable urban infrastructure and wider adoption.

Annex A – National Policy and Regulatory Matrix for Shared Urban Charging in Colombia

This annex compiles the principal **national public policy, legal, and regulatory instruments** that shape the enabling environment for shared urban charging in Colombia. It supports the analysis in Chapters 3 through 8 by distinguishing between:

- strategic policy instruments,
- binding legal obligations,
- operational market rules, and
- interpretive guidance relevant to deployment in shared urban settings.

Annex A Matrix

Source	Type	Core provision	Relevance to shared urban charging	Use in paper	Public link
CONPES 3934 de 2018 – Política de Crecimiento Verde	National policy document	Establishes Colombia's green growth framework and includes the target that 600,000 electric vehicles should form part of the national fleet by 2030.	Sets the scale of future electrification and helps justify why charging infrastructure must be treated as a national implementation issue.	Chapters 1, 2, 4, 8	DNP summary page

CONPES 4075 de 2022 – Política de Transición Energética	National policy document	Links energy transition, sustainable transport, efficiency, competitiveness, and low-emissions development through a national policy framework.	Connects electric mobility and charging infrastructure to Colombia's wider transition agenda and supports the paper's systems-level framing.	Chapters 1, 2, 4, 8	DNP announcement
Ley 1964 de 2019 – Promoción del uso de vehículos eléctricos	National law	Promotes electric and zero-emission vehicles; includes provisions on charging stations and requires new residential and commercial buildings, under specified conditions, to provide electrical access and supporting infrastructure for EV charging.	Foundational legal source connecting electric mobility to the built environment and charging readiness.	Chapters 1, 4, 5, 6, 8	SUIN legal portal

Ley 2169 de 2021 – Ley de Acción Climática	National law	Establishes Colombia's climate-policy architecture for carbon neutrality, resilience, and sectoral climate action.	Provides the broader legal climate framework that supports transport decarbonization and associated infrastructure development.	Chapters 1, 2, 4	Official SUIN text
Resolución 40223 de 2021 – Condiciones mínimas de estandarización y de mercado para la infraestructura de carga	Ministerial resolution	Establishes definitions, standardization criteria, and market conditions for charging infrastructure for electric and plug-in hybrid vehicles; clarifies the legal treatment of charging as a service.	Critical for understanding third-party operation, charging-as-a-service models, and the distinction between charging service and electricity commercialization.	Chapters 4, 5, 6, 7, 8	MinEnergía normativity portal

Resolución 40123 de 2024 – Interoperabilidad para estaciones de carga de acceso público	Ministerial resolution	Establishes interoperability conditions for public-access charging stations for electric and plug-in hybrid vehicles; defines scope, actors, and operational obligations.	Core operational source for the paper's treatment of interoperability, service provision, public access, and network functionality.	Chapters 1, 4, 6, 7, 8	Official SUIN text
CREG thematic index – Vehículos eléctricos, estaciones de carga	Regulatory gateway / thematic index	Compiles CREG materials related to EV charging and electrolineras, including technical and regulatory documents.	Shows that charging infrastructure has been recognized as a distinct regulatory topic within the energy sector.	Chapters 4, 8	CREG Alejandría thematic page
Circular 20 de 2020 CREG – Revisión de experiencias internacionales sobre electrolineras	Regulatory circular / technical input	Socializes a technical study on international experience with EV charging stations and related regulatory needs in electricity markets.	Useful for explaining the evolution of regulatory attention to charging infrastructure and market design.	Chapters 4, 8	Official CREG circular page

Concepto 100 de 2025 SSPD – Servicio de carga de vehículos eléctricos en propiedades horizontales	Legal concept / interpretive guidance	Clarifies that EV charging is a servicio de carga, not a domiciliary public service and not electricity commercialization; discusses implications for horizontal property regimes.	Highly relevant for multifamily housing, co-owned properties, shared governance, billing, and deployment in shared urban environments.	Chapters 4, 5, 6, 8	Official SSPD concept

Annex B – Workshop and Stakeholder Engagement Findings

This annex compiles the main findings generated through MubOn's stakeholder-engagement activities relevant to the enabling environment for shared urban charging in Colombia. It supports the analysis in Chapters 3 through 8 by organizing evidence from:

- the **Bogotá workshop**,
- the **Cali workshop**,
- the **private-sector engagement track**, and
- the **residential-segment webinar**.

The purpose of the annex is to synthesize the barriers and opportunities identified by stakeholders across four recurring dimensions:

- **regulation and implementation**,
- **financing and business models**,
- **technology and operations**, and
- **capacity and awareness**.
  This aligns with the current technical paper, which defines Annex B as the place for workshop findings across regulation, financing, technology, and capacity.

Annex B Matrix

Engagement activity	Type	Objective / audience	Main findings	Relevance to shared urban charging	Use in paper	Source

Workshop 1 – Bogotá	Stakeholder workshop	Workshop on **conditions enabling electric-mobility adoption in Bogotá**, using a participatory exercise to identify gaps in **financing, capacity development, regulation, and technology**.	Main conclusions recorded were: need for concrete action plans by participating entities; need to review and synthesize the barriers raised; significant **misinformation in the residential and commercial segments**; **non-compliance with charger norms in public areas**; and insufficient education on the topic.	Strong evidence for the paper's arguments on implementation gaps, weak compliance, lack of awareness, and constraints in public/shared charging environments.	Chapters 3, 5, 7, 8	Bogotá workshop minutes.

Workshop 2 – Cali	Stakeholder workshop	Workshop on **conditions enabling electric-mobility adoption in Cali**, also structured around barriers in **financing, capacity development, regulation, and technology**.	Main conclusions recorded were: **difficulty implementing actions**; need to disseminate norms and discuss implementation barriers; need to understand electric mobility as an **integral transition** and not only a fleet issue; **outdated norms** that do not support charging infrastructure; need to adjust the **Manual de Construcción Sostenible**; lack of urban networks; rural deployment constraints; battery fire-safety concerns; need to build a sustainability culture; and importance of a just energy transition.	Strong evidence for the paper's arguments on regulatory obsolescence, technical and safety concerns, urban-network gaps, and the need for broader ecosystem alignment.	Chapters 3, 5, 6, 7, 8	Cali workshop minutes.

Event II – Private Sector Engagement	Concept note / planned engagement	Event designed to engage **dealerships, showrooms, logistics companies, light cargo fleets, shopping centers, institutional actors, and ecosystem stakeholders** around MubOn's charging solution.	This document provides **intended stakeholder scope and expected outputs**, not post-event findings. Expected outputs included: **actionable recommendations to overcome barriers persisting despite regulations**, socialization of the proposal to include charging points in **CASA Colombia**, and initial steps toward **technical or financial synergies** to scale fast-charging infrastructure.	Useful for documenting the design and purpose of the private-sector engagement track, but should be used cautiously because it is not a final findings report.	Chapter 3 and Chapter 7; selective use in Chapter 8	Event II concept note.

Webinar III – Residential Communities	Final event report / stakeholder evidence	Webinar focused on **electric mobility in residential communities**, targeting property managers, boards, residents, and property-management firms.	Main concerns identified were: risks from **unregulated individual charger installations**; possible **electrical overload**; lack of clarity on **responsibility and maintenance**; **RETIE compliance** concerns; hidden costs of individual installations; billing complexity; and scalability challenges as EV adoption grows. The report also shows that the communal model was well received, stakeholders require more technical and regulatory guidance, and there is clear and growing demand for residential EV	This is the strongest engagement source for the paper's arguments on horizontal property, communal charging, operational clarity, and the need for scalable shared-use models.	Chapters 3, 5, 6, 7, 8	Webinar III final report.

			charging solutions.			

Annex C – Technical Requirements, Design Standards, and Certification Pathways

This annex compiles the principal technical requirements, design standards, and certification pathways that can help translate Colombia's high-level regulatory willingness on electric mobility into clearer implementation routes for buildings, residential communities, and shared urban charging environments.
Its purpose is to support Chapter 6 by identifying:

- which frameworks already contain useful EV-charging criteria,
- where they can reduce implementation confusion,
- how they can support design and compliance in shared urban settings,
- and where they remain insufficient and require reform or adaptation.

This responds directly to the paper's central diagnosis: Colombia already has an advanced regulatory and policy framework for electric mobility, but implementation remains limited by incomplete technical standards, lack of clarity in co-owned properties, weak compliance, and insufficient integration into practical design and certification systems. The diagnosis explicitly states that certification systems such as LEED already include charging infrastructure credits, that CASA Colombia addresses electric mobility in existing housing and is considering its incorporation in new housing, and that Envision promotes sustainable transport from an infrastructure perspective.

Annex C Matrix

Framework / reference	Type	What it contributes	How it helps close the implementation gap	Relevance to shared urban charging	Main limitation	Use in paper	Source
LEED – New Buildings	Building certification system	LEED includes a credit for Electric Vehicles in new buildings. The CCCS diagnosis specifies two relevant pathways: install Level 2+ charging stations in at least 5% of parking spaces or two spaces, whichever is greater, or provide EV-ready infrastructure in at least 10% of parking spaces or six	Helps clarify what EV-ready design can look like in practice: dedicated circuits, minimum parking thresholds, technical readiness, and Level 2 capacity. This is exactly the kind of design specificity often missing in implementation.	High. Especially relevant for new residential, commercial, and mixed-use projects.	Voluntary system; not a binding Colombian standard.	Chapters 6 and 8	CCCS diagnosis on LEED.

		spaces, with dedicated circuits terminating in a nearby junction box.					
LEED – Existing Buildings / O+M	Building operations certification	LEED O+M uses transportation performance and occupant mobility as part of operational performance, and the diagnosis notes that electric mobility can improve transportation-related scoring by reducing transport emissions from building users.	Useful for repositioning EV charging as an operational building-performance issue, not only a new-construction issue. Helps support retrofits and management logic in existing assets.	Medium to high. Especially useful for existing office, commercial, and institutional buildings.	Less direct on charger-installation detail than the new-building credit.	Chapters 6 and 8	CCCS diagnosis on LEED O+M.

LEED for Cities and Communities – Clean Transportation	Community / city certification system	The diagnosis states that LEED for Cities and Communities promotes charging stations in public parking and low-emission transport planning, including a benchmark of EVSE in 2% of public parking spaces and supporting charging-station density thresholds.	Helps close the gap between building-scale compliance and city-scale deployment by showing how charging can be treated as part of a wider public or shared urban mobility system.	Very high. Strongest certification reference for the paper's broader shared-urban-charging thesis.	Still voluntary and mainly a planning/benchmark tool.	Chapters 6 and 8	CCCS diagnosis on LEED for Cities and Communities.

CASA Colombia – New Housing	Colombian housing certification system	CASA new housing currently does not include a dedicated electric-mobility guideline, though the diagnosis notes that future access may be possible through innovation or future versions.	Important because it reveals a current implementation gap: Colombia's own mainstream housing certification still does not systematically integrate EV-readiness. That makes CASA a key reform pathway, not yet a mature solution.	Medium. Strategically important because it is Colombian, but currently underdeveloped for EV charging.	Limited present usefulness for direct compliance guidance.	Chapters 6, 7, 8	CCCS diagnosis on CASA new housing.

CASA Colombia – Existing Housing (EB2 Movilidad)	Existing-housing technical guideline	EB2 Mobility provides concrete criteria for residential communities. It awards points if a residential unit or its co-owned property has charging infrastructure, or if the unit is within 1 km of a public charging station. It also requires a communication strategy and allows credit through EV-ready or installed charging conditions.	This is one of the strongest tools for reducing confusion in horizontal property and residential settings because it translates electric mobility into practical criteria that residents, administrators, and project teams can understand.	Very high. Most directly relevant framework for residential communities and communal/shared-use charging.	Residential focus only; does not cover broader city or mixed-use infrastructure logic.	Chapters 6 and 8	EB2 Mobility reference.

Envision	Infrastructure sustainability framework	The diagnosis identifies Envision credits that encourage sustainable transport, reduction of air pollutant emissions, and innovation. It explicitly notes that transport improvements can include strategies that promote electric mobility and broader integrated transport systems.	Helps close the implementation gap on the infrastructure side by framing shared charging as part of sustainable infrastructure and urban-system design, not only as a building amenity.	High. Strong complement for public-space, corridor, and infrastructure-linked charging.	Less useful for detailed building-level charger requirements.	Chapters 6 and 8	CCCS diagnosis on Envision.

EDGE	Building certification system	The diagnosis states that EDGE does not include strategies associated with electric mobility, nor is there meaningful near-term potential for that inclusion under its current scope.	Useful mainly as a boundary marker: not all sustainability certifications currently help solve the implementation gap for EV charging.	Low. Should not carry analytical weight.	Not a useful design or policy pathway for this paper.	Mention briefly in Chapter 6 only	CCCS diagnosis on EDGE.

Annex D – Public Policy Implementation and Action Matrix

Purpose of this Annex

This annex compiles the principal implementation actions proposed for accelerating electric mobility in Colombia, with a particular focus on the enabling conditions for shared urban charging. It is based on the **Public Policy Implementation Plan: Electric Mobility in Colombia and its Promotion from the Construction and Buildings Sector**, which defines the general objective, specific goals, strategic axes, governance mechanisms, monitoring indicators, and financing priorities for implementation.

The annex supports Chapters 4 through 8 by translating broad policy goals into an operational implementation framework. Its purpose is to show how regulatory, financial, technical, governance, and capacity-building actions could be sequenced and monitored in practice.

Annex D Matrix

Strategic axis / action area	Main actions proposed	Responsible institutions	Timeline	Indicators	Relevance to shared urban charging	Use in paper	Source
Normative and regulatory strengthening	Issue technical regulations for EV pre-installation in new buildings and adaptation in existing buildings; regulate chargers and safety protocols; establish penalties	MinVivienda, MinEnergía, ICONTEC, Superintendencia de Industria y Comercio.	2025–2027.	% of construction licenses with EV service connection; % of projects complying with the 2% parking rule.	Very high. This is the most direct implementation pathway for translating legal obligations into deployable charging conditions in buildings	Chapters 4, 5, 6, 8	Public Policy Implementation Plan.

	for non-compliance with the 2% parking-space rule.				and shared sites.		
Compliance in buildings and parking lots	Integrate EV requirements into urban licenses; implement annual verification in commercial and public buildings; adapt existing buildings through incentives.	Mayoral offices, Curadurías, CCCS.	2025–2030.	Number of adapted buildings; % of normative compliance.	Very high. This is central to the paper because shared urban charging depends not only on rules, but on actual compliance in buildings, parking, and existing urban stock.	Chapters 5, 6, 8	Public Policy Implementation Plan.

Charging infrastructure and technological network	Install at least 50 initial public charging points; create a national plan for interoperable stations; expand fast charging in cities and intercity corridors; modernize the grid.	UPME, energy companies, mayoral offices, MinTransporte.	2025–2030.	Number of fast-charging stations installed; installed capacity (MW).	Very high. This is the clearest implementation bridge between shared urban charging, interoperability, public access, and grid readiness.	Chapters 4, 6, 8	Public Policy Implementation Plan.
Incentives and financing	Create green credit lines for EVs and chargers; tax incentives for builders and users; promote PPA-type business models for charging stations.	MinHacienda, Bancóldex, national banking actors, mayoral offices.	2025–2029.	Number of green loans; total leveraged investment.	High. This is crucial for the paper's argument that infrastructure deployment is constrained by financing and that scalable service models are needed	Chapters 5, 7, 8	Public Policy Implementation Plan.

					for shared charging.		
Transition of public and mass-transit fleets	Meet progressive electrification quotas: 10% by 2025, 20% by 2027, 40% by 2029, 100% by 2035; ensure that 30% of vehicles acquired by public entities are electric.	MinTransporte, mayoral offices, mass-transit companies.	2025–2035.	% of mass fleet renewed; % of electrified official fleets.	Medium to high. This matters because fleet electrification increases charging demand and strengthens the case for urban charging networks, though it is somewhat broader than the paper's core focus.	Chapters 4, 8	Public Policy Implementation Plan.
Technical training and civic culture	Training programs for technicians, designers, and builders; massive awareness campaigns	SENA, universities, industry guilds, CCCS.	2025–2029.	Number of technicians trained; citizens reached.	High. This directly addresses the awareness and capacity gaps identified in the workshop	Chapters 5, 7, 8	Public Policy Implementation Plan.

	; inclusion of electric mobility in academic curricula.				s and is especially relevant for scaling shared charging safely and credibly.		
Governance and interinstitutional articulation	Create an Interinstitutional Electric Mobility Council; establish regional boards in key cities; develop coordination protocols between mayoral offices, the private sector, and utilities.	MinTransporte, MinVivienda, MinAmbiente, UPME, energy companies, mayoral offices.	2025–2030.	Number of active regional boards; number of interinstitutional meetings.	Very high. Shared urban charging is inherently cross-sectoral, so governance and coordination are not secondary issues; they are implementation conditions.	Chapters 4, 7, 8	Public Policy Implementation Plan.